

## Chapter 1 : Endocrine Glands and Functions

*Endocrine glands are glands of the endocrine system that secrete their products, hormones, directly into the blood rather than through a duct. The major glands of the endocrine system include the pineal gland, pituitary gland, pancreas, ovaries, testes, thyroid gland, parathyroid gland, hypothalamus and adrenal glands.*

The hypothalamus is the link between the endocrine and nervous systems. The hypothalamus produces releasing and inhibiting hormones, which stop and start the production of other hormones throughout the body. The hypothalamus plays a significant role in the endocrine system. Heart rate and blood pressure Body temperature Fluid and electrolyte balance, including thirst Appetite and body weight Glandular secretions of the stomach and intestines Production of substances that influence the pituitary gland to release hormones Sleep cycles The hypothalamus is involved in many functions of the autonomic nervous system, as it receives information from nearly all parts of the nervous system. As such, it is considered the link between the nervous system and the endocrine system. You can learn more by reading a SpineUniverse article about the nervous system. Anatomy of the Hypothalamus The hypothalamus is located below the thalamus a part of the brain that relays sensory information and above the pituitary gland and brain stem. It is about the size of an almond. Hormones of the Hypothalamus The hypothalamus is highly involved in pituitary gland function. When it receives a signal from the nervous system, the hypothalamus secretes substances known as neurohormones that start and stop the secretion of pituitary hormones. Primary hormones secreted by the hypothalamus include: This hormone increases water absorption into the blood by the kidneys. CRH sends a message to the anterior pituitary gland to stimulate the adrenal glands to release corticosteroids, which help regulate metabolism and immune response. GnRH stimulates the anterior pituitary to release follicle stimulating hormone FSH and luteinizing hormone LH , which work together to ensure normal functioning of the ovaries and testes. In children, GH is essential to maintaining a healthy body composition. In adults, it aids healthy bone and muscle mass and affects fat distribution. Oxytocin is involved in a variety of processes, such as orgasm, the ability to trust, body temperature, sleep cycles, and the release of breast milk. PRH prompts the anterior pituitary to stimulate breast milk production through the production of prolactin. Conversely, PIH inhibits prolactin, and thereby, milk production. Thyrotropin releasing hormone TRH: TRH triggers the release of thyroid stimulating hormone TSH , which stimulates release of thyroid hormones, which regulate metabolism, energy, and growth and development. Hypothalamic Disease A disease or disorder of the hypothalamus is known as a hypothalamic disease. A physical injury to the head that impacts the hypothalamus is one of the most common causes of hypothalamic disease. Hypothalamic diseases can include appetite and sleep disorders, but because the hypothalamus affects so many different parts of the endocrine system , it can be hard to pinpoint whether the root cause of the disorder is actually related to another gland. These are known as hypothalamic-pituitary disorders. However, there are hormone tests that help shed light on which part of the body is the root cause. The hypothalamus is arguably the most essential of the endocrine system. By alerting the pituitary gland to release certain hormones to the rest of the endocrine system, the hypothalamus ensures that the internal processes of your body are balanced and working as they should.

### Chapter 2 : Endocrine gland | Define Endocrine gland at racedaydvl.com

*The endocrine system is made up of a network of glands. These glands secrete hormones to regulate many bodily functions, including growth and metabolism. Endocrine diseases are common and usually occur when glands produce an incorrect amount of hormones. Simply put, the endocrine system is a network.*

What are the Most Common Endocrine Disorders? These hormones are in charge of several functions in the body, from heartbeat to tissue growth to the creation of new life. Each gland in the endocrine system serves a specific purpose, and even a small issue with one or more of these glands can interrupt the careful balance the body strikes with these hormones—this is called an endocrine disorder. Types of Endocrine Disorders

**Diabetes** is the most common endocrine disorder diagnosed in the United States, but there are many others. Symptoms can include fatigue, stomach issues, dehydration and skin changes. **Overproduction of the pituitary gland hormone**, leading to an overactive adrenal gland. **Gigantism acromegaly** and other growth hormone problems: If the pituitary gland produces too much growth hormone, bones and body parts may grow too quickly in children. Alternatively, if growth hormone levels are too low, growth might be stunted. This disorder is characterized by the thyroid gland producing too much thyroid hormone. This can lead to weight loss, rapid heart rate, sweating and nervousness. When the thyroid gland produces too little thyroid hormone, fatigue, constipation, dry skin and depression can occur. In children, hypothyroidism can cause slowed development. This occurs when the pituitary gland releases little or no hormones. Women with this condition may stop having menstrual cycles. These are rare genetic conditions that cause tumors of the parathyroid, adrenal and thyroid glands and cause overproduction of hormones. **Polycystic ovary syndrome PCOS**: Overproduction of androgens that interferes with the development of eggs and their release from female ovaries. **Abnormally early puberty** that occurs when glands incorrectly tell the body to release sex hormones too early.

**Causes of Endocrine Disorders** The causes of endocrine disorders are grouped into categories: Disorders caused by a gland producing too much or too little of a hormone, called a hormone imbalance. Disorders due to the development of lesions in the endocrine system that can affect hormone levels. Specific causes of hormone imbalance may include: Tests here can include blood and urine tests to check hormone levels, and imaging tests may be done if a tumor or nodule needs to be located. If you have symptoms of an endocrine disorder, speak to your doctor or endocrinologist for a testing and treatment plan. As trained specialists, our providers know the latest treatments and technologies to treat a variety of disorders.

### Chapter 3 : Endocrine gland - Wikipedia

*Your endocrine system includes all the glands in your body that make hormones. These chemical messengers play a key role in making sure your body works the way it should. If your endocrine system.*

**Endocrine Glands** What is Endocrine System? Hormones are chemicals that affect a lot of the bodily functions ranging from hunger, reproduction and growth to much more complicated functions like human emotions and behaviour. These hormones are produced in our body through nine primary glands and these glands, along with other organs that provide auxiliary functions make up the endocrine system. **Endocrine Glands** Unlike exocrine glands sweat, salivary , endocrine glands secrete their respective substances directly into the blood stream rather than through a duct. Some glands are specific to either male testes or female ovaries **Major Endocrine Glands** **Pituitary gland** Enclosed deep within the skull, the pituitary gland is the size of a pea. It hangs on a stalk at the base of the brain. It consists of an anterior portion that produces hormones and a posterior portion that has many neural links. This gland is regarded as the master gland as it controls the functions of all the other glands such as the adrenal, thyroid glands in the endocrine system. The pituitary gland also secretes prolactin, which stimulates the production of milk. **Thyroid gland** The thyroid glands can be found at the front of the neck. It sits low in the throat, between the windpipe. Brownish red, it has blood vessels coursing through it. It secretes hormones that are collectively called thyroid hormones. **Parathyroid glands** The parathyroid glands consist of four small glands that are located behind the thyroids in the neck. They influence the calcium levels in the body by producing a hormone called Parathyroid Hormone. Sometimes, when the gland produces excess parathyroid hormones, it can have negative effects such as brittle bones and kidney stones. **Adrenal glands** The adrenal glands sit atop the kidneys and are no larger than a walnut. These glands produce over hormones that regulate different functions in the body. The most well known is Adrenaline, which triggers the flight or fight response. In other words, this is a stress hormone that helps the organism to either face a dangerous situation or to avoid it all together. It does this by: Increasing blood sugar levels Increasing the blood supply to the muscles, particularly to the limbs. Dilating the pupils Tightening the jaw muscles. **Pancreas** The pancreas is exocrine as well as an endocrine gland that sits behind the stomach. It is roughly 6 inches long and rather flat. Pancreas has two primary roles to play: Producing digestive enzymes Producing hormones such as insulin and glucagon. As we are all aware, lack of insulin causes type 1 and type 2 diabetes. Lack of glucagon leads to hypoglycemia. Another key difference between the two is insulin becomes active when the blood glucose levels are high, and glucagon become active only when blood glucose levels are low. **Gonads** Some glands are specific to males or females. For instance, the ovaries are specific to females, and are located in the pelvic cavity. While the testes are specific to males. Ovaries produce estrogen that is important for reproduction and female sex characteristics. Testes produce testosterone that is responsible for male sex characteristics. Also, it results in increased muscle mass and body hair. **Pineal gland** The pineal gland is located between the two halves of the brain. Factors such as jet lag, or working the night shift has a more noticeable effect on an individual because Circadian rhythm tends to coincide with the day and night cycle. Found this article interesting? Practise This Question Accidental pituitary stalk damage will cause all except Diabetes mellitus.

## Chapter 4 : Endocrine glands: MedlinePlus Medical Encyclopedia

*Hypersecretion is when too many hormones are secreted from a gland. Hyposecretion is when too few hormones are released. There are many types of disorders that can result when too much or too little of a hormone is released. Disorders that may result when a particular gland does not produce the.*

Check new design of our homepage! Endocrine Glands and Functions One of the most important components required by the human body for its daily functioning is the endocrine system. This article provides some information about the different endocrine glands and its functions. Bodytomy Staff The endocrine system is responsible to help the body carry out many of its functions. The endocrine glands secrete hormones directly into the blood stream, rather than through a duct. That is the reason these glands are also known as ductless glands. Processes which are associated with growth, development, body metabolism, and reproduction, are all fueled by hormones secreted by these glands. Functions of the Endocrine Glands Pituitary Gland This gland has its location at the base of the brain. It is known as the master gland, because it is responsible to control the function of other glands to put forth their hormones. Growth, body metabolism, sexual development, and reproduction happen to be the elements which come under the domain of the pituitary gland. The thyroid gland functions by releasing two main hormones, thyroxine and triiodothyronine. These hormones play vital roles in regulating metabolism and organ function. Pancreas Pancreas, as most of us must be knowing, are the endocrine glands that are situated in the abdominal region, behind the stomach. The hormones which get secreted into the blood stream by these glands, serve to control proper digestion and blood sugar regulation. Insulin and glucagons are known to be the important hormones produced by the glands. One of the major function of the pancreas is maintaining appropriate levels of sugar throughout the body. Adrenal Glands On the upper side of the kidneys, are located these endocrine glands. In hormone production, there are two parts of these adrenal glands which comes into play. One is known as the adrenal cortex. It is known to steroid hormones, which are essential for digestion and sexual maturity. The other is what is known as the adrenal medulla. Now the hormones that this part secretes, are although not essential to sustain life, but help the body to manage stress and improve the quality of life. Hypothalamus The hypothalamus gland is actually a part of the pituitary gland. The hormones that it secretes do the work of inducing the master gland, so that it can go on with its normal function. Growth-hormone-releasing hormone GHRH , somatostatin, and dopamine, are the hormones which are released by this gland, which we discussed. Parathyroid Glands These are located behind the thyroid gland, and that may be the reason they are known as parathyroid glands. They are there with the work of regulating the amount of calcium in the blood stream. Pineal Gland The function of this endocrine gland is to secrete melatonin. Gonads Male gonads are known as the testes, and ovaries in case of females. These glands produce hormones and cells that are vital to reproduction, in males and females. Hormones Produced by Endocrine Glands Pituitary gland Antidiuretic hormone vasopressin - Its primary function is to help the kidneys to retain water in the body. Human growth hormone - As the name suggests, it is associated with the growth and development of the body. It is also known to encourage the production of protein. Luteinizing hormone and follicle-stimulating hormone - Important functions like the production of sperm and semen, and menstruation, are looked after by this particular hormone. Secondary sexual characteristics such as hair growth pattern, muscles, texture and thickness of the skin, nature of the voice, etc. Oxytocin - Helps contraction of the uterus muscles and mammary ducts in the breast. Prolactin - The process of milk production in the mammary glands is carried out by this hormone. Thyroid-stimulating hormone - Again, as the name suggests, this hormone is responsible for the functions of the hormones of the thyroid gland. Calcitonin - It regulates calcium balance in species other than humans. Studies are still in progress to find its function in the human species. Pancreas Glucagon - The blood sugar level raises with its help. Insulin - It helps in lowering the blood sugar level. Apart from this, metabolism of sugar, protein, and fat are also carried out with its help. Adrenal glands Aldosterone - Responsible for maintaining the salt and water balance in the body. Cortisol - The functions which regulate the blood sugar level, blood pressure, and muscle strength in the body is controlled by the cortisol. Dehydroepiandrosterone DHEA - It is related to the immune system, bones growth,

and also to the mood of an individual. Epinephrine and norepinephrine - The nervous system is associated with it. Somatostatin - It works by regulating the endocrine system. Dopamine - It inhibits the release of prolactin from the anterior lobe of the pituitary gland. Parathyroid glands Parathyroid hormone - Calcium and phosphorus are eliminated from the body with the help of this hormone, which is also responsible for bone formation. Ovaries Estrogen - The female sexual characteristics and the function of the reproductive system are influenced by the secretion of this hormone. Progesterone - It plays vital roles in pregnancy. For instance, it helps in preparing the lining of the uterus for the fertilized egg to get implanted. The endocrine system helps in keeping the body working optimally. Any malfunction in this system triggers the occurrence of bouts of medical condition and various unpleasant, mild to severe symptoms.

## Chapter 5 : About the Endocrine System - Endocrine Glands and Hormones

*The endocrine system is the collection of glands that produce hormones that regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep, and mood, among.*

Oxytocin Antidiuretic hormone ADH All of the releasing and inhibiting hormones affect the function of the anterior pituitary gland. TRH stimulates the anterior pituitary gland to release thyroid-stimulating hormone. GnRH stimulates the release of follicle stimulating hormone and luteinizing hormone while CRH stimulates the release of adrenocorticotrophic hormone. The last two hormones—oxytocin and antidiuretic hormone—are produced by the hypothalamus and transported to the posterior pituitary, where they are stored and later released. Pituitary Gland The pituitary gland, also known as the hypophysis, is a small pea-sized lump of tissue connected to the inferior portion of the hypothalamus of the brain. Many blood vessels surround the pituitary gland to carry the hormones it releases throughout the body. Situated in a small depression in the sphenoid bone called the sella turcica, the pituitary gland is actually made of 2 completely separate structures: Posterior Pituitary The posterior pituitary gland is actually not glandular tissue at all, but nervous tissue instead. The posterior pituitary is a small extension of the hypothalamus through which the axons of some of the neurosecretory cells of the hypothalamus extend. These neurosecretory cells create 2 hormones in the hypothalamus that are stored and released by the posterior pituitary: Oxytocin triggers uterine contractions during childbirth and the release of milk during breastfeeding. Antidiuretic hormone ADH prevents water loss in the body by increasing the re-uptake of water in the kidneys and reducing blood flow to sweat glands. Anterior Pituitary The anterior pituitary gland is the true glandular part of the pituitary gland. The function of the anterior pituitary gland is controlled by the releasing and inhibiting hormones of the hypothalamus. The anterior pituitary produces 6 important hormones: Thyroid stimulating hormone TSH, as its name suggests, is a tropic hormone responsible for the stimulation of the thyroid gland. Adrenocorticotrophic hormone ACTH stimulates the adrenal cortex, the outer part of the adrenal gland, to produce its hormones. Follicle stimulating hormone FSH stimulates the follicle cells of the gonads to produce gametes—ova in females and sperm in males. Luteinizing hormone LH stimulates the gonads to produce the sex hormones—estrogens in females and testosterone in males. Human growth hormone HGH affects many target cells throughout the body by stimulating their growth, repair, and reproduction. Prolactin PRL has many effects on the body, chief of which is that it stimulates the mammary glands of the breast to produce milk. Pineal Gland The pineal gland is a small pinecone-shaped mass of glandular tissue found just posterior to the thalamus of the brain. The pineal gland produces the hormone melatonin that helps to regulate the human sleep-wake cycle known as the circadian rhythm. The activity of the pineal gland is inhibited by stimulation from the photoreceptors of the retina. This light sensitivity causes melatonin to be produced only in low light or darkness. Increased melatonin production causes humans to feel drowsy at nighttime when the pineal gland is active. Thyroid Gland The thyroid gland is a butterfly-shaped gland located at the base of the neck and wrapped around the lateral sides of the trachea. The thyroid gland produces 3 major hormones: Calcitonin Triiodothyronine T3 Thyroxine T4 Calcitonin is released when calcium ion levels in the blood rise above a certain set point. Calcitonin functions to reduce the concentration of calcium ions in the blood by aiding the absorption of calcium into the matrix of bones. Increased levels of T3 and T4 lead to increased cellular activity and energy usage in the body. Parathyroid Glands The parathyroid glands are 4 small masses of glandular tissue found on the posterior side of the thyroid gland. The parathyroid glands produce the hormone parathyroid hormone PTH, which is involved in calcium ion homeostasis. PTH is released from the parathyroid glands when calcium ion levels in the blood drop below a set point. PTH stimulates the osteoclasts to break down the calcium containing bone matrix to release free calcium ions into the bloodstream. PTH also triggers the kidneys to return calcium ions filtered out of the blood back to the bloodstream so that it is conserved. Adrenal Glands The adrenal glands are a pair of roughly triangular glands found immediately superior to the kidneys. The adrenal glands are each made of 2 distinct layers, each with their own unique functions: Adrenal cortex The adrenal cortex produces many cortical hormones in 3 classes: Glucocorticoids have many diverse functions,

including the breakdown of proteins and lipids to produce glucose. Glucocorticoids also function to reduce inflammation and immune response. Mineralocorticoids, as their name suggests, are a group of hormones that help to regulate the concentration of mineral ions in the body. Androgens, such as testosterone, are produced at low levels in the adrenal cortex to regulate the growth and activity of cells that are receptive to male hormones. In adult males, the amount of androgens produced by the testes is many times greater than the amount produced by the adrenal cortex, leading to the appearance of male secondary sex characteristics.

**Adrenal medulla** The adrenal medulla produces the hormones epinephrine and norepinephrine under stimulation by the sympathetic division of the autonomic nervous system. These hormones also work to increase heart rate, breathing rate, and blood pressure while decreasing the flow of blood to and function of organs that are not involved in responding to emergencies.

**Pancreas** The pancreas is a large gland located in the abdominal cavity just inferior and posterior to the stomach. The pancreas is considered to be a heterocrine gland as it contains both endocrine and exocrine tissue. Within these islets are 2 types of cells—alpha and beta cells. The alpha cells produce the hormone glucagon, which is responsible for raising blood glucose levels. Glucagon triggers muscle and liver cells to break down the polysaccharide glycogen to release glucose into the bloodstream. The beta cells produce the hormone insulin, which is responsible for lowering blood glucose levels after a meal. Insulin triggers the absorption of glucose from the blood into cells, where it is added to glycogen molecules for storage.

**Gonads** The gonads—ovaries in females and testes in males—are responsible for producing the sex hormones of the body. These sex hormones determine the secondary sex characteristics of adult females and adult males. The testes are a pair of ellipsoid organs found in the scrotum of males that produce the androgen testosterone in males after the start of puberty. Testosterone has effects on many parts of the body, including the muscles, bones, sex organs, and hair follicles. This hormone causes growth and increases in strength of the bones and muscles, including the accelerated growth of long bones during adolescence. During puberty, testosterone controls the growth and development of the sex organs and body hair of males, including pubic, chest, and facial hair. In men who have inherited genes for baldness testosterone triggers the onset of androgenic alopecia, commonly known as male pattern baldness. The ovaries are a pair of almond-shaped glands located in the pelvic body cavity lateral and superior to the uterus in females. The ovaries produce the female sex hormones progesterone and estrogens. Progesterone is most active in females during ovulation and pregnancy where it maintains appropriate conditions in the human body to support a developing fetus. Estrogens are a group of related hormones that function as the primary female sex hormones. The release of estrogen during puberty triggers the development of female secondary sex characteristics such as uterine development, breast development, and the growth of pubic hair. Estrogen also triggers the increased growth of bones during adolescence that lead to adult height and proportions.

**Thymus** The thymus is a soft, triangular-shaped organ found in the chest posterior to the sternum. The thymus produces hormones called thymosins that help to train and develop T-lymphocytes during fetal development and childhood.

**Other Hormone Producing Organs** In addition to the glands of the endocrine system, many other non-glandular organs and tissues in the body produce hormones as well. The cardiac muscle tissue of the heart is capable of producing the hormone atrial natriuretic peptide ANP in response to high blood pressure levels. ANP works to reduce blood pressure by triggering vasodilation to provide more space for the blood to travel through. ANP also reduces blood volume and pressure by causing water and salt to be excreted out of the blood by the kidneys. The kidneys produce the hormone erythropoietin EPO in response to low levels of oxygen in the blood. EPO released by the kidneys travels to the red bone marrow where it stimulates an increased production of red blood cells. The number of red blood cells increases the oxygen carrying capacity of the blood, eventually ending the production of EPO. The hormones cholecystokinin CCK, secretin, and gastrin are all produced by the organs of the gastrointestinal tract. CCK, secretin, and gastrin all help to regulate the secretion of pancreatic juice, bile, and gastric juice in response to the presence of food in the stomach. Adipose tissue produces the hormone leptin that is involved in the management of appetite and energy usage by the body. When the body contains a sufficient level of adipose for energy storage, the level of leptin in the blood tells the brain that the body is not starving and may work normally. If the level of adipose or leptin decreases below a certain threshold, the body enters starvation mode and attempts to conserve energy

through increased hunger and food intake and decreased energy usage. Adipose tissue also produces very low levels of estrogens in both men and women. In obese people the large volume of adipose tissue may lead to abnormal estrogen levels. In pregnant women, the placenta produces several hormones that help to maintain pregnancy. Human chorionic gonadotropin HCG assists progesterone by signaling the ovaries to maintain the production of estrogen and progesterone throughout pregnancy. Prostaglandins and leukotrienes are produced by every tissue in the body except for blood tissue in response to damaging stimuli. These two hormones mainly affect the cells that are local to the source of damage, leaving the rest of the body free to function normally. Prostaglandins cause swelling, inflammation, increased pain sensitivity, and increased local body temperature to help block damaged regions of the body from infection or further damage. Leukotrienes help the body heal after prostaglandins have taken effect by reducing inflammation while helping white blood cells to move into the region to clean up pathogens and damaged tissues.

**Physiology of the Endocrine System**

**Endocrine System vs. Nervous System Function** The endocrine system works alongside of the nervous system to form the control systems of the body. The nervous system provides a very fast and narrowly targeted system to turn on specific glands and muscles throughout the body. The endocrine system, on the other hand, is much slower acting, but has very widespread, long lasting, and powerful effects. Hormones are distributed by glands through the bloodstream to the entire body, affecting any cell with a receptor for a particular hormone. Most hormones affect cells in several organs or throughout the entire body, leading to many diverse and powerful responses.

**Hormone Properties** Once hormones have been produced by glands, they are distributed through the body via the bloodstream. As hormones travel through the body, they pass through cells or along the plasma membranes of cells until they encounter a receptor for that particular hormone. Hormones can only affect target cells that have the appropriate receptors. This property of hormones is known as specificity. Hormone specificity explains how each hormone can have specific effects in widespread parts of the body.

### Chapter 6 : What are the Most Common Endocrine Disorders? | Revere Health

*Endocrine Glands are important parts of the endocrine system of the human body. This IvyRose Revision page about the endocrine system is intended for students of first-level courses such as ITEC, A-Level and other introductory clinical courses.*

The hypothalamus hi-po-THAL-uh-mus is in the lower central part of the brain. It links the endocrine system and nervous system. Nerve cells in the hypothalamus make chemicals that control the release of hormones secreted from the pituitary gland. The hypothalamus gathers information sensed by the brain such as the surrounding temperature, light exposure, and feelings and sends it to the pituitary. This information influences the hormones that the pituitary makes and releases. The pituitary puh-TOO-uh-ter-ee gland is at the base of the brain, and is no bigger than a pea. Despite its small size, the pituitary is often called the "master gland. The pituitary gland makes many hormones, such as: The pituitary also secretes hormones that signal the reproductive organs to make sex hormones. The pituitary gland also controls and the menstrual cycle in women. The thyroid THY-royd is in the front part of the lower neck. These hormones control the rate at which cells burn fuels from food to make energy. The more thyroid hormone there is in the bloodstream, the faster chemical reactions happen in the body. Attached to the thyroid are four tiny glands that work together called the parathyroids par-uh-THY-roydz. They release parathyroid hormone, which controls the level of calcium in the blood with the help of calcitonin kal-suh-TOE-nin , which the thyroid makes. These two triangular adrenal uh-DREE-nul glands sit on top of each kidney. The adrenal glands have two parts, each of which makes a set of hormones and has a different function: The outer part is the adrenal cortex. The inner part is the adrenal medulla muh-DUH-luh. Also called adrenaline, epinephrine increases blood pressure and heart rate when the body is under stress. The pineal pih-NEE-ul body, also called the pineal gland, is in the middle of the brain. It secretes melatonin meh-luh-TOE-nin , a hormone that may help regulate when we sleep at night and wake in the morning. The gonads are the main source of sex hormones. In boys the male gonads , or testes TES-teez , are in the scrotum. Estrogen is involved when a girl starts puberty. During puberty, a girl will have breast growth, start to accumulate body fat around the hips and thighs, and have a growth spurt. These hormones also play a role in pregnancy. Insulin helps keep the body supplied with stores of energy. The body uses this stored energy for exercise and activity, and it also helps organs work as they should. Get plenty of exercise. Go for regular medical checkups. Talk to the doctor before taking any supplements or herbal treatments. Let the doctor know about any family history of endocrine problems, such as diabetes or thyroid problems. When Should I Call the Doctor? Let the doctor know if your child:

## Chapter 7 : Endocrine System

*The Endocrine System Access more 3D visualizations by downloading the Hormone Health Network's 3D Patient Education mobile app! The endocrine system is a series of glands that produce and secrete hormones that the body uses for a wide range of functions.*

Works on the seminiferous tubules in the testes to produce sperm which take 21 days to mature. If not ejaculated within 21 days, the sperm are re-absorbed back into the body. Intermediate Control of melanocyte production. It functions as a gland, secreting the hormone melatonin - which regulates the pituitary gland and is associated with the biological clock. Melatonin A hormone produced by the pineal gland in darkness but not in bright light. Melatonin is derived from serotonin, with which it works to regulate the sleep cycle. Hypo-Thyroidism Symptoms; decrease in BMR; weight gain; lethargy; skin becomes dry and puffy; hair becomes thin and brittle. Uptake of calcium to bone. Associated with the growth of muscle and bone. Distribution of calcium and phosphate in the body. Parathormone activity is inhibited by oestrogen. Hypo-Lowers blood calcium levels, causing tetany which may be treated by injections of the hormone ; low calcium levels in skeletal muscle which may cause cramps. The thymus a gland associated with the immune system , is enclosed in a capsule and divided internally by cross-walls into many lobules full of T-lymphocytes. In relation to body size the thymus is largest at birth. It doubles in size by puberty, after which it gradually shrinks, its functional tissue being replaced by fatty tissue. In infancy the thymus controls the development of lymphoid tissue and the immune response to microbes and foreign proteins accounting for allergic response, autoimmunity, and the rejection of organ transplants. T-lymphocytes migrate from the bone marrow to the thymus, where they mature and differentiate until activated by antigen. T-Lymphocytes The thymus consists of lobules full of T-lymphocytes white blood cells associated with antibody production. T-lymphocytes migrate from the bone marrow to the thymus, where they mature and differentiate until activated by antigens. It is both exocrine ducted and endocrine ductless. As an exocrine gland it secretes enzymes organic catalysts into the small intestine. Pancreatic amylase which breaks down polysaccharides, i. The islets of Langerhans are within the pancreas. Islets of Langerhans Located within the pancreas. Contains groups of both Alpha- and Beta- cells. Beta Cells Conversion of glucose to glycogen. Cellular up-take of Glucose. Conversion of excess glucose to fat. Hyper- Hypo- causes Diabetes Mellitus: Blood glucose levels rise hyperglycaemia. Glucose is excreted into the urine glycosuria - which increases levels of urination, causing dehydration. As glucose levels in the blood increase, fat and protein are broken-down for energy. Coma and death may follow if the symptoms are not treated.

## Chapter 8 : Endocrine System: Facts, Functions and Diseases

*The endocrine glands secrete hormones directly into the blood stream, rather than through a duct. That is the reason these glands are also known as ductless glands. Processes which are associated with growth, development, body metabolism, and reproduction, are all fueled by hormones secreted by these glands.*

**Pituitary gland** The pituitary gland hangs from the base of the brain by a stalk and is enclosed by bone. It consists of a hormone-producing glandular portion anterior pituitary and a neural portion posterior pituitary, which is an extension of the hypothalamus. The hypothalamus regulates the hormonal output of the anterior pituitary and creates two hormones that it exports to the posterior pituitary for storage and later release. Four of the six anterior pituitary hormones are tropic hormones that regulate the function of other endocrine organs. Most anterior pituitary hormones exhibit a diurnal rhythm of release, which is subject to modification by stimuli influencing the hypothalamus. Somatotrophic hormone or Growth hormone GH is an anabolic hormone that stimulates growth of all body tissues but especially skeletal muscle and bone. It may act directly, or indirectly via insulin-like growth factors IGFs. GH mobilizes fats, stimulates protein synthesis, and inhibits glucose uptake and metabolism. Hypersecretion causes gigantism in children and acromegaly in adults; hyposecretion in children causes pituitary dwarfism. Thyroid-stimulating hormone TSH promotes normal development and activity of the thyroid gland. Thyrotropin-releasing hormone TRH stimulates its release; negative feedback of thyroid hormone inhibits it. Adrenocorticotrophic hormone ACTH stimulates the adrenal cortex to release corticosteroids. The gonadotropins – follicle-stimulating hormone FSH and luteinizing hormone LH regulate the functions of the gonads in both sexes. FSH stimulates sex cell production; LH stimulates gonadal hormone production. Gonadotropin levels rise in response to gonadotropin-releasing hormone GnRH. Negative feedback of gonadal hormones inhibits gonadotropin release. Prolactin PRL promotes milk production in human females. The neurohypophysis stores and releases two hypothalamic hormones: Oxytocin stimulates powerful uterine contractions, which trigger labor and delivery of an infant, and milk ejection in nursing women. Its release is mediated reflexively by the hypothalamus and represents a positive feedback mechanism. Antidiuretic hormone ADH stimulates the kidney tubules to reabsorb and conserve water, resulting in small volumes of highly concentrated urine and decreased plasma osmolarity. ADH is released in response to high solute concentrations in the blood and inhibited by low solute concentrations in the blood. Hyposecretion results in diabetes insipidus.

**Thyroid** The thyroid gland is located at the front of the neck, in front of the thyroid cartilage, and is shaped like a butterfly, with two wings connected by a central isthmus. Thyroid tissue consists of follicles with stored protein called colloid, containing thyroglobulin, a precursor to other thyroid hormones, which are manufactured within the colloid. The thyroid hormones increase the rate of cellular metabolism, and include thyroxine T4 and triiodothyronine T3. Secretion is stimulated by the hormone TSH, secreted by the anterior pituitary. When thyroid levels are high, there is negative feedback that decreases the amount of TSH secreted. Most T4 is converted to T3 a more active form in the target tissues. Calcitonin, produced by the parafollicular cells of the thyroid gland in response to rising blood calcium levels, depresses blood calcium levels by inhibiting bone matrix resorption and enhancing calcium deposit in bone.

**Parathyroid gland** The parathyroid glands, of which there are four, are found on the back of the thyroid glands, and secrete parathyroid hormone PTH, [1] which causes an increase in blood calcium levels by targeting bone, the intestine, and the kidneys. PTH is the antagonist of calcitonin. PTH release is triggered by falling blood calcium levels and is inhibited by rising blood calcium levels.

**Adrenal gland** The adrenal glands are located above the kidneys in humans and in front of the kidneys in other animals. The adrenal glands produce a variety of hormones including adrenaline and the steroids aldosterone and cortisol. It stimulates the heart and its conducting tissues and metabolic processes.

**Pancreas** The pancreas, located in the abdomen, below and behind the stomach, is both an exocrine and an endocrine gland. The alpha and beta cells are the endocrine cells in the pancreatic islets that release insulin and glucagon and smaller amounts of other hormones into the blood. Insulin and glucagon influence blood sugar levels. Glucagon is released when blood glucose level is low, and stimulates the liver to release glucose into the blood. Insulin

increases the rate of glucose uptake and metabolism by most body cells. Gonad The ovaries of the female, located in the pelvic cavity, release two main hormones. Secretion of estrogens by the ovarian follicles begins at puberty under the influence of FSH. Estrogens stimulate maturation of the female reproductive system and development of the secondary sexual characteristics. Progesterone is released in response to high blood levels of LH. It works with estrogens in establishing the menstrual cycle. The testes of the male begin to produce testosterone at puberty in response to LH. Testosterone promotes maturation of the male reproductive organs, development of secondary sex characteristics, and production of sperm by the testes. Pineal gland The pineal gland is located in the diencephalon of the brain. It primarily releases melatonin , which influences daily rhythms and may have an antigonadotropic effect in humans.

### Chapter 9 : Endocrine glands - Health Video: MedlinePlus Medical Encyclopedia

*The endocrine system is made up of glands that produce and secrete hormones, chemical substances produced in the body that regulate the activity of cells or organs. These hormones regulate the body's growth, metabolism (the physical and chemical processes of the body), and sexual development and function.*

The endocrine system is the collection of glands that produce hormones that regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep, and mood, among other things. Function The endocrine system is made up of the pituitary gland , thyroid gland , parathyroid glands , adrenal glands , pancreas , ovaries in females and testicles in males , according to the Mayo Clinic. The word endocrine derives from the Greek words "endo," meaning within, and "crinis," meaning to secrete, according to Health Mentor Online. In general, a gland selects and removes materials from the blood, processes them and secretes the finished chemical product for use somewhere in the body. The endocrine system affects almost every organ and cell in the body, according to the Merck Manual. Although the hormones circulate throughout the body, each type of hormone is targeted toward certain organs and tissues, the Merck Manual notes. The endocrine system gets some help from organs such as the kidney, liver, heart and gonads, which have secondary endocrine functions. The kidney, for example, secretes hormones such as erythropoietin and renin. The thyroid also secretes a range of hormones that affect the whole body. Hormone diseases also occur if your body does not respond to hormones in the appropriate ways. The most common endocrine disease in the United States is diabetes , a condition in which the body does not properly process glucose, a simple sugar. This is due to the lack of insulin or, if the body is producing insulin, because the body is not working effectively, according to Dr. Jennifer Loh, chief of the department of endocrinology for Kaiser Permanente in Hawaii. Diabetes can be linked to obesity, diet and family history, according to Dr. Infections and medications such as blood thinners can also cause adrenal deficiencies. Diabetes is treated with pills or insulin injections. Managing other endocrine disorders typically involves stabilizing hormone levels with medication or, if a tumor is causing an overproduction of a hormone, by removing the tumor. Treating endocrine disorders takes a very careful and personalized approach, Myers said, as adjusting the levels of one hormone can impact the balance of other hormones. Hormone imbalances can have a significant impact on the reproductive system, particularly in women, Loh explained. It has an easy treatment, though. The damaged part of the gland is removed surgically. Thyroid cancer begins in the thyroid gland and starts when the cells in the thyroid begin to change, grow uncontrollably and eventually form a tumor, according to Loh. Tumors " both benign and cancerous " can also disrupt the functions of the endocrine system, Myers explained. Between the years of and , the cases of thyroid cancer diagnosed yearly have more than tripled, according to a study published in the Journal of the American Medical Association JAMA. Julie Sosa, one of the authors of the new study and the chief of endocrine surgery at Duke University in North Carolina. The American Cancer Society predicts that there will be about 53, new cases of thyroid cancer in and around 2, deaths from thyroid cancer. Hypoglycemia, also called low blood glucose or low blood sugar, occurs when blood glucose drops below normal levels. This typically happens as a result of treatment for diabetes when too much insulin is taken. While Loh noted that the condition can occur in people not undergoing treatment for diabetes, such an occurrence is fairly rare. What is an endocrinologist? After completing four years of medical school, people who want to be endocrinologists then spend three or four years in an internship and residency program. These specialty programs cover internal medicine, pediatrics, or obstetrics and gynecology, according to the American Board of Internal Medicine. Endocrinologists-in-training then spend two or three more years learning how to diagnose and treat hormone conditions. They are certified by the American Board of Internal Medicine. Endocrinologists typically specialize in one or two areas of endocrinology, such as diabetes or infertility. These specialists treat patients with fertility issues and also assess and treat patients with health concerns surrounding menstruation and menopause, Loh noted. Milestones in the study of the endocrine system B. The Chinese begin isolating sex and pituitary hormones from human urine and using them for medicinal purposes In medieval Persia, the writer Avicenna provides a detailed account on diabetes mellitus

in "The Canon of Medicine" c. Irish doctor Robert James Graves describes a case of goiter with bulging eyes exophthalmos. William Bayliss and Ernest Starling perform an experiment in which they observe that acid instilled into the duodenum part of the small intestine causes the pancreas to begin secretion, even after they had removed all nervous connections between the two organs. Joseph von Mering and Oskar Minkowski observe that surgically removing the pancreas results in an increase of blood sugar, followed by a coma and eventual death. Leonard Thompson, at age 14, is the first person with diabetes to receive insulin. Drugmaker Eli Lilly soon starts mass production of insulin. Additional reporting by Alina Bradford, Live Science contributor. The endocrine system produces hormones that regulate your body and mind.